Oct. 7, 1969 M. D. JOHNS ET AL 3,470,844

MARINE OUTDRIVE LATCH

Filed Jan. 4, 1968 3 Sheets-Sheet 1

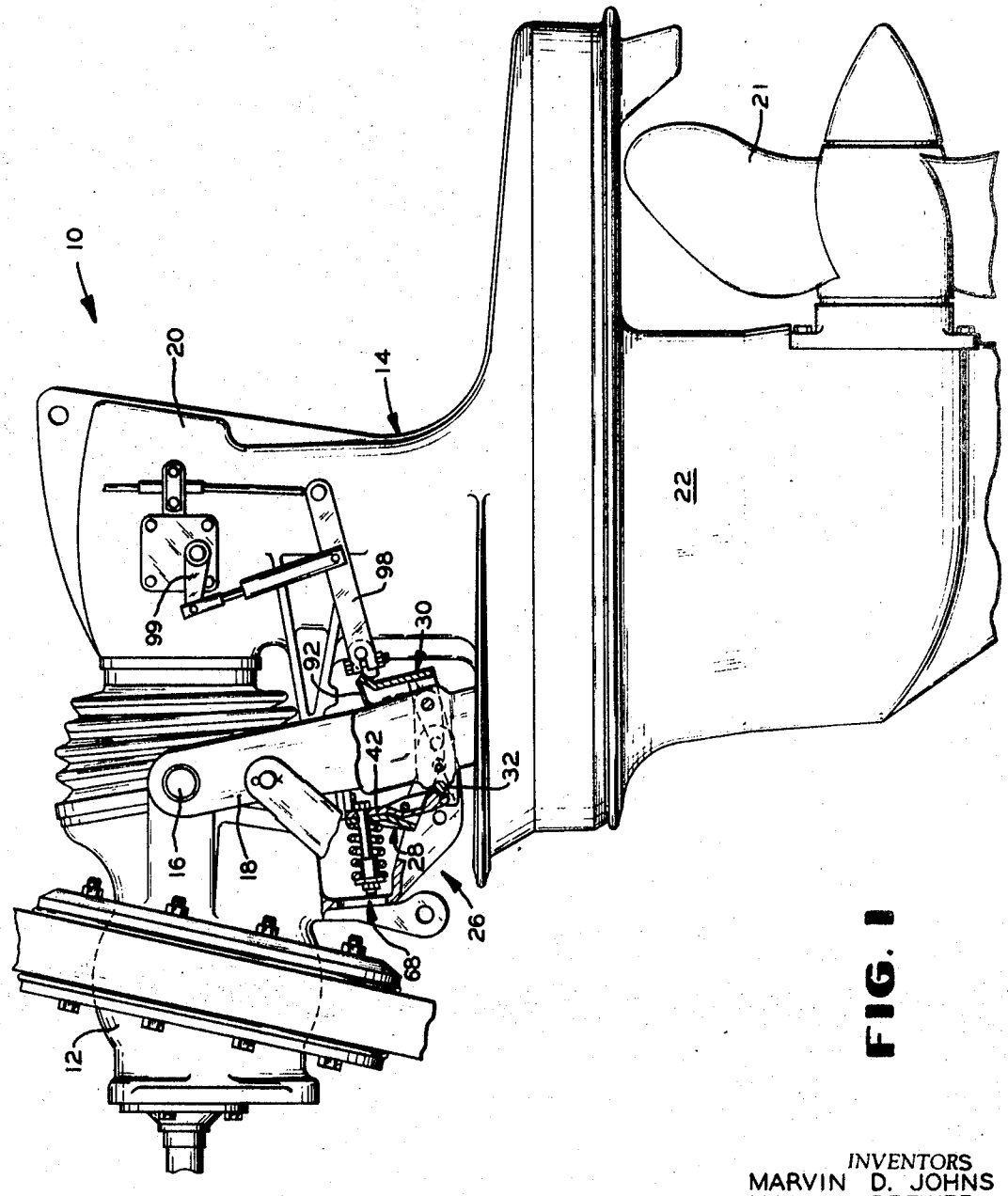


FIG. 1

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MARINE OUTDRIVE LATCH

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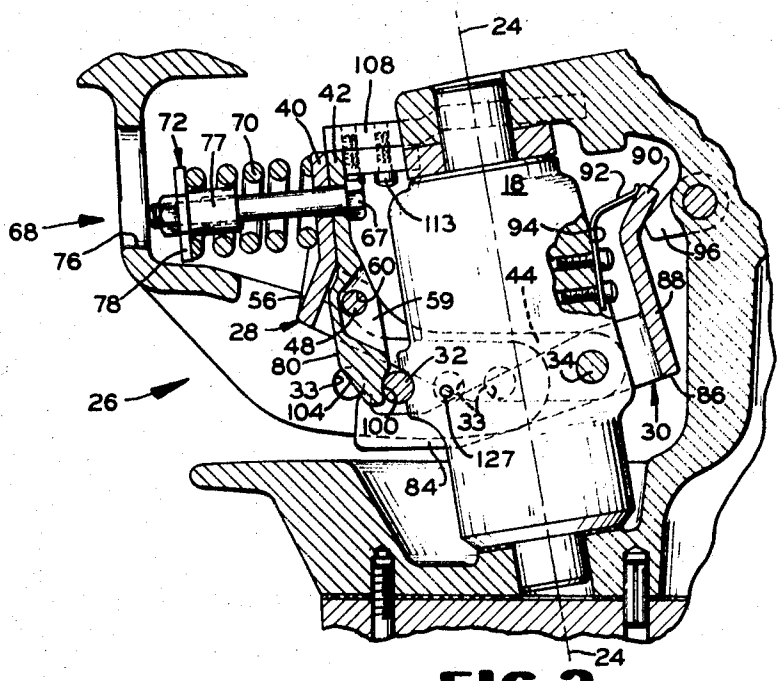


FIG. 2

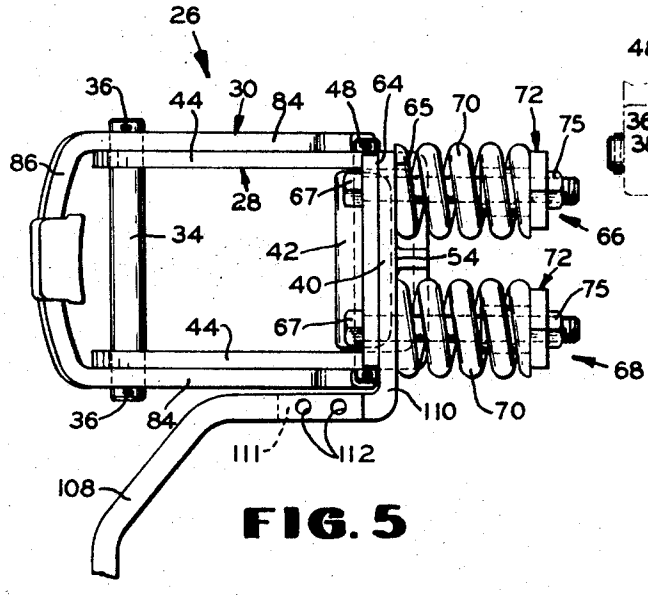


FIG. 5

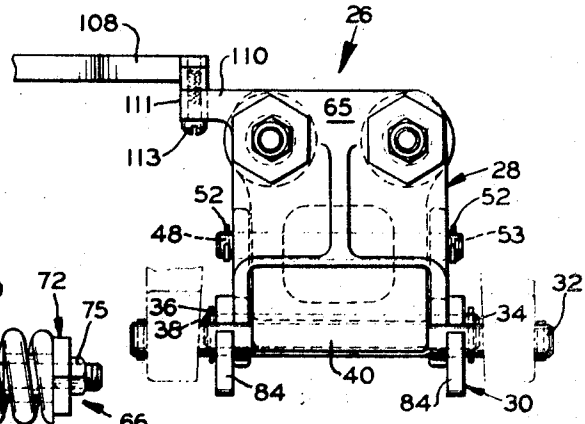


FIG. 4

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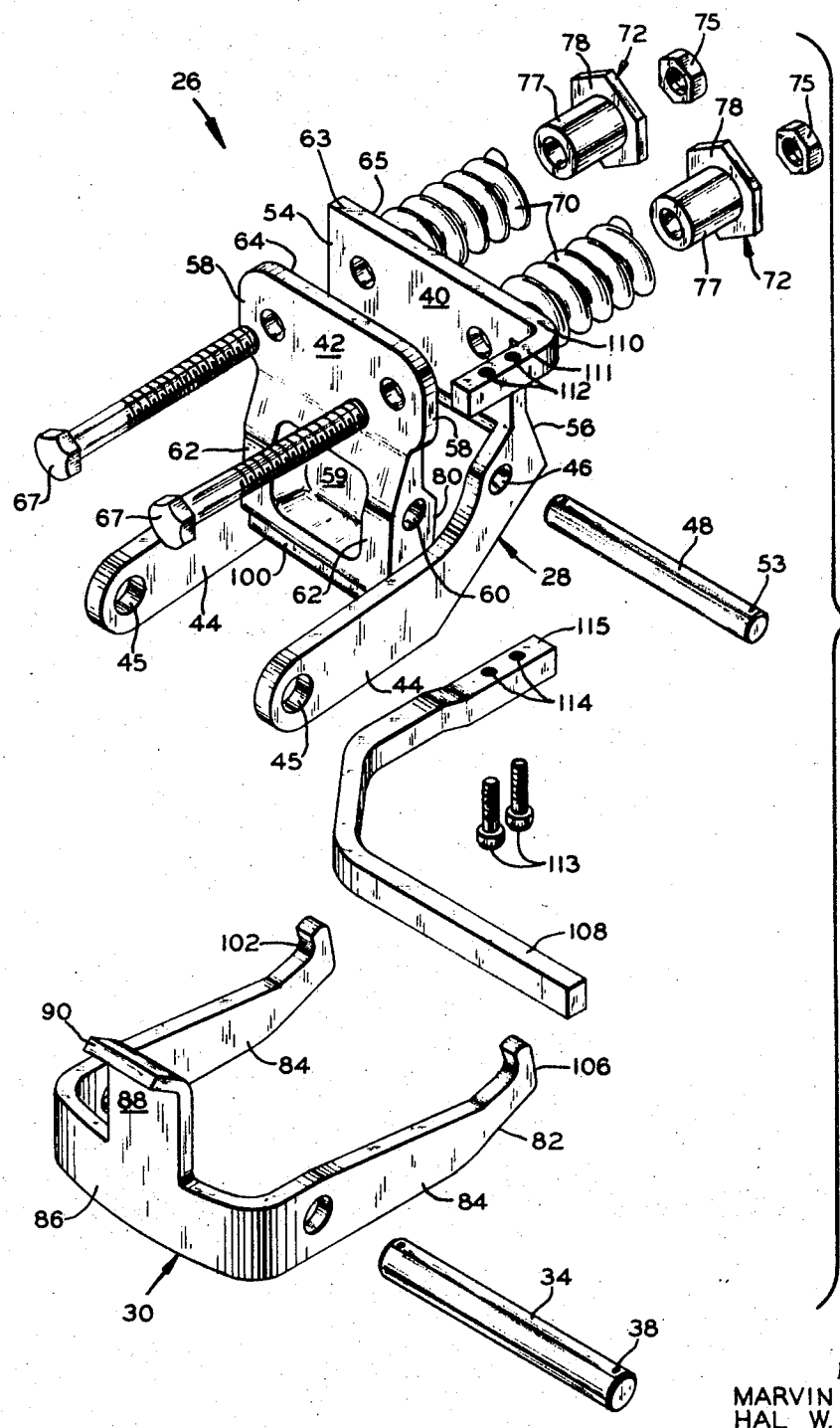


FIG.3

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3,470,844

MARINE OUTDRIVE LATCH

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Int. Cl. B63h 5/06, 1/14
U.S. Cl. 115—41 7 Claims

ABSTRACT OF THE DISCLOSURE

A latch arrangement for a marine drive unit in which a pair of commonly pivoted latches are spring biased and disposed so as to engage a common abutment means so that the lower latch prevents release for pivoting of the marine drive unit when the marine drive is in reverse gear and the downwardly disposed upper latch, commonly pivoted with the reverse latch, prevents pivoting of the marine drive unit in neutral and forward gear under propulsion conditions while still permitting the marine drive unit to kick up when it encounters a waterborne obstruction.

Marine latch units are known wherein spring biased latch means are mounted between an outboard power leg and relatively stationary portion of the marine drive unit to prevent pivoting of the unit into a tilted up position. But most of these units do not effectively release upon meeting a waterborne obstruction or do not positively limit the swing up of the marine drive unit under normal operating conditions in reverse, forward and neutral positions of the marine drive.

Although an application, owned by the same assignee as the instant application, entitled "Marine Outdrive Latch" and filed on Feb. 27, 1967, and having the Ser. No. 618,706, discloses a marine latch arrangement curing the above deficiencies, this marine latch arrangement must be made of such a size, to be effective, that it cannot be utilized in all types of marine drive units. The area available for installation of the marine latch is limited in these marine drive arrangements so that a different latch arrangement of smaller dimensions must be utilized.

Accordingly, it is an object of this invention to provide a latch arrangement for a marine drive unit which is compact and yet positively insures kick up of the unit upon encountering a waterborne obstruction.

It is an additional object of this invention to provide a positive latching arrangement for a marine drive unit wherein pivoting for kick up is provided in forward and neutral drive positions under normal operating conditions.

It is a further object of the invention to insure positive, predetermined kick up of the marine drive unit upon impact with a waterborne obstruction by positive resilient loading of the forward latch.

It is yet a further object of the invention to resiliently load the reverse latch independently of the forward latch to insure positive engagement thereof independent of the action of the forward latch when the marine drive unit is in reverse.

Other and further objects of this invention will be apparent from the following description and appended claims and may be understood by reference to the accompanying drawings which, by way of illustration, show a preferred embodiment of the invention and what is considered to be the best mode for applying the above principles.

In a preferred embodiment of the invention a pair of latch assemblies are commonly pivoted on a pivot means on a yoke that carries the outboard leg of a power drive unit. These latch assemblies are resiliently urged towards

each other to lockingly surround a locking pin means mounted on that portion of the marine drive unit which is vertically fixed relative to the boat. The lower latch assembly provides locking for reverse drive and is resiliently urged to pivot upwardly and into locking engagement with the pin means and serves as the lock for the outboard power leg for the marine drive in reverse gear. In forward and neutral gear positions, urging means abuts a bent portion of the lower latch assembly and pivotally urges it clockwise downwardly out of locking relationship with the pin means. The urging means is controlled by the shift lever linkage for the marine drive unit.

The forward latch assembly assumes a locking position around the pin means for all transmission positions of the marine drive unit, this latch being urged to locking position by a separate resilient mounting means mounted with the outdrive power leg unit. This latch assembly is also provided with a bent hook means arrangement mounted on the forward latch assembly adjacent the pin means for manually moving this latch to disengaged position. The forward latch means is spring loaded by a precompressed coil spring which is preloaded so as to be capable of upset so that the latch means may pivot out of engagement with the locking pin means upon the marine drive unit encountering an obstruction which imposes an impacting load thereagainst. Because of the geometry of this latch assembly and the spring biased lever, this latch assembly is incapable of locking the marine drive unit in reverse gear so that such locking must be accomplished by the lower latch assembly.

In the drawings:

FIG. 1 is a side view partly in section of the marine drive unit and included latch means with the marine drive unit in reverse drive;

FIG. 2 is an enlarged side view partially in section of a portion of FIG. 1 showing the latch means and related actuating elements with the marine drive unit in neutral drive;

FIG. 3 is an exploded view of the upper and lower latch assemblies and resilient biasing means therefor;

FIG. 4 is an end view of the resilient mount for the latch assembly; and

FIG. 5 is a partial plan view of the yoke and resilient biasing means for the reverse latch.

Referring now more particularly to the drawings and specifically to FIG. 1, there is shown a marine drive unit **10** having a relatively fixed portion formed by a motor housing **12** and an outboard power leg **14** mounted for vertical pivotal movement by means of a pivot arrangement **16** mounted in the legs of a Y-shaped yoke **18**. The outboard power leg **14** may, thus, be easily pivoted vertically from a downwardly disposed power drive position to an upwardly disposed position for performance of maintenance and to avoid any obstructions in the water. The outboard power leg **14** includes an upper housing portion **20** and a lower housing portion **22**, these housing portions enclosing the gear drive for the propeller **21** mounted on the lower housing portion **22**.

Steering of the boat is accomplished through movement of a yoke member **18** around a vertical axis **24**, **24** formed by a pivot means (not shown) so that steering for the marine drive unit **10** through the outboard power leg **14** may be easily accomplished. Thus, thrust is provided by the propeller **21** against the water so that a boat having the marine drive unit **10** mounted thereon may be easily propelled through the water and, by the turning of the outboard power leg **14**, the boat may be steered in a rightwardly or leftwardly direction.

Turning to FIGS. 2–5, a latching means **26** is provided to lock the outboard power leg **14** and the yoke **18** relative to each other and prevent undesired kick up of the

outboard power leg when propulsion thrust is being delivered by the marine drive unit **10**. This latching means includes a pin locking member **32** and a pair of latch assemblies **28** and **30** resiliently mounted and pivoted so as to be engageable therewith to prevent thrust transmitted from the propeller from urging the outboard power leg **14** out of the water. The pin locking member **32** may be mounted in any one of a series of bores **33**, **33** so as to adjust the trim of the marine drive unit **10**.

As is best seen in FIGS. 1 and 2, the forward latch assembly **28** is disposed in nested relationship with the reverse latch assembly **30**. A pin means **34** mounted fixed with respect to the yoke **18** extends outwardly therefrom and pivotally mounts the latch assemblies **28** and **30** for pivoting on a common pivot point. A cotter pin **36**, on each side of the pin means **34**, extends through a bore **38** extending transversely through the pin means to limit movement of the cotter pin relative to the yoke **18** (FIG. 2). The latch assemblies **28** and **30**, thus, bear against a portion of the yoke **18** so as to be disposed encompassingly thereon to be bearingly and pivotally mounted on the pin means **34**.

The forward latch assembly **28** comprises an outer kick up lever **40** and an inner kick up lever **42**. The outer kick up lever **40** is generally clevis shaped in cross section with the inner kick up lever **42** disposed in a nesting relationship with the outer kick up lever **40** by being disposed between a pair of leg portions **44**, **44** of the clevis shape. The leg portions **44**, **44** extend in a somewhat angular relationship to the inner kick up lever **42** and are each provided with a bore **45** near their ends for reception of the pivot pin means **34**. Leg portions **44**, **44** also each have a bore **46** extending therethrough for reception of a pin means **48**, said pin means extending beyond the leg portions **44**, **44** outwardly of the outer kick up lever **40**. The major portion of the pin means **48** extends between the leg portions **44**, **44** and through the bores **46**, **46** and is held in this position by a pair of cotter pins **52**, **52** extending through transverse bores **53**, **53** in the pin means **48**. An upstanding portion **54** extending generally vertically on the outer kick up lever **40** intermediate the leg portions **44**, **44** provides an abutting surface for reception of the inner kick up lever **42** thereagainst so as to place the inner kick up lever in a generally vertical position prior to upset. An angular portion **56** attached to the upstanding portion **54** extends angularly downwardly away from the upstanding portion **54** and is attached to the leg portions **44**, **44**. Thus, the outer kick up lever **40** is of general U-shape with the leg portions **44**, **44** of the U attached to the angularly bent portion comprising the angular portion **56**.

The inner kick up lever **42** is somewhat similar to the strike member on any lock and is of generally T-shape, the T-shape being formed by a pair of ears **58**, **58** extending at rightward angles near one end of the inner kick up lever **42** opposite the end of the inner kick up lever forming the striking surface. A depression **59**, generally of rectangular shape, is provided in the thickened leg of the T portion of the inner kick up lever **42** opposite the strike surface of the inner kick up lever. The purpose of this depression is that of a weight relief, i.e., to save on material costs. A pair of bores **60**, **60** extend through a pair of longitudinal portions **62**, **62** of the inner kick up lever **42** which border the depression **59**. The bores **60** and **60** provide for the mounting of a pin member **48** which extends therethrough and through the bores **46**, **46** of the outer kick up lever so as to pivotally mount the inner kick up lever relative to the outer kick up lever **40**. A flattened portion **64** on the inner kick up lever abuts against the upstanding portion **54** of the outer kick up lever **40** so that these two portions are in alignment, thus the inner kick up lever **42** is positively located relative to the outer kick up lever **40** except upon upset. The inner kick up lever **42**, beyond the depression **59**, is provided with a cutaway notched portion **100** which abuts against and nestingly conforms with the pin locking member **32**. By this arrangement, locking engagement is had between the pin locking member **32** and forward latch **28**.

Mounted so as to extend into a clearance hole **76** on the housing **12** are a pair of bolt and nut assemblies **66**, **68** respectively, these nut and bolt assemblies also extend in a general horizontal plane towards the yoke **18**. Mounted on each of the bolts **67** of each of the nut and bolt assemblies **66**, **68** is a coil spring **70**, one end of each coil spring **70** abutting a flat surface **65** on the flattened portion **63** of the outer kick up lever and the outer end of each of the coil springs abutting against a pilot nut **72** threaded on each of the bolts **67**, **67**, each of the said pilot nuts **72** extending partially into the clearance hole **76** in the housing **12**. The pilot nut **72** is of generally hat shape in cross section to provide a rim **78** extending around the periphery of the pilot nut **72**. The piloting member **72** thereby supplies a seat formed by the rim **78** and a centering means formed by the crown portion **77** of the pilot nut **72** to center the coil spring **70** and prevent misalignment of it so that positive upset is provided. As is set out previously, the opposite end of the coil spring **70** abuts against the flattened portion **63** of the outer kick up lever **40** to thereby urge the inner and outer kick up levers into abutting position and inner kick up notched portion **100** into engagement with the pin **32**.

The coil springs **70** are designed, and precompressed by the tightening of each of the nuts **75**, so as to provide a precalculated preload prior to upset. Upset occurs when the outboard power leg **14** abuts against an obstruction in the water. Impact loading of this impinging shock (with the reverse latch **30** disengaged) is transmitted through the power leg **14** to the steering yoke **18** and through the pin **34** which pulls the forward latch against the pin **32** causing the forward latch to pivot in the following manner. Outer kick up lever **40** pulls the pin **48** in a counterclockwise direction tending to turn the inner kick up lever **42** in a clockwise direction adjacent its abutment with the coil springs **70**, **70** against the urging of the coil springs **70**, **70**. If the force of impingement is of sufficient magnitude, the coil springs, **70**, **70** are compressed and the inner kick up lever **42** rotates clockwise until an abutment portion **80** thereon moves against the angular portion **56** of the outer kick up lever **40**. This moves the inner kick up lever **42** a sufficient distance clockwise so that it clears the locking pin means **32** so that the outboard power leg **14** and yoke **18** may swing counterclockwise to permit kick up of the outboard power leg **14** and allow the boat and marine drive unit **10** to pass over the obstruction without damage.

In order to insure proper upsetting of the inner kick up lever **42** during forward or neutral drive positions of the marine drive unit **10**, the force of coil spring **70** must be selected so that its force is insufficient to prevent upset and vertical kick up of the outboard power leg **14** when it is placed in reverse drive, the thrust of the propeller in this position being sufficient to overcome preloading caused by the coil spring **70**.

In order to provide positive locking of the marine drive unit in reverse drive, a reverse latch **82** of general U-shape in cross section having legs **84**, **84** is utilized. A bight portion **86** of the reverse latch **82** connects the two legs **84**, **84** and includes an upstanding portion of **88** extending upwardly and centered relative to the linear dimension of the bight with the legs **84**, **84** extending around and encompassing in a nesting relation a portion of the outer kick up lever **40**. The upstanding portion **88** includes a bent tang portion **90** that provides a convenient engagement point for manual or automatic movement of the reverse latch **82** to a disengaged position from the pin means **32**.

The reverse latch **82** is pivoted, as set out previously, on the pin means **34** and is constantly urged clockwise into engaged position by means of a bent leaf spring **92** disposed between the bent tang portion **90** and an abutting surface **94** on the yoke member **18**. Engagement

between the reverse latch **82** and locking pin means **32** occurs by engagement of a notch **102** on the reverse latch with the locking pin means **32**. The bent tang portion **90** is positioned so as to be engageable by a rounded end portion **96** of an interlock member **98** connected to the shift mechanism **99** (FIG. 1) for the power for the marine drive unit. **10**. The interlock **98** engages the bent tang portion **90** through its rounded end **96** whenever the marine drive unit is in forward or neutral drive thus urging the reverse latch **82** in a clockwise direction away from the pin locking member **32**. In this position, the reverse latch **82** does not engage the pin member. Thus, the bent leaf spring **92** only provides for locking of the reverse latch **82** when the marine drive unit is in reverse drive.

Upon kick up, in either forward or neutral gear, provision is made to permit the marine drive unit **10** to return to locked and trimmed position. As the inner and outer kick up leavers **40, 42** swing clockwise with the outboard power leg **14** back towards engaged position (from kick up position) with the pin locking means **32**, a cam surface **104** on the inner kick up lever **42** abuts the locking pin means **32** urging the outer kick up lever **40** to rotate counterclockwise about the pin **34** carrying the inner kick up lever **42** therewith. Positive location of the cam surface **104** is obtained by the use of a pin means **127** which limits clockwise swinging of the inner and outer kick up levers **42, 40** by abutment therewith. The just related camming action permits the inner kick up lever **42** to swing sufficiently far counterclockwise so that it passes over the pin locking means **32** and again assumes the position illustrated in FIG 2, the force of gravity being sufficient to insure this positioning.

At the same time, if the marine drive unit **10** is in reverse gear in kick up position it cannot again assume the latched, trim position illustrated in FIG. 1. A vertical, straight surface **106** forming the rightward extremity of the reverse latch **82** forms an abutting surface which engages the pin locking means **32** on downward swing preventing full latching from occurring. A shift of the marine drive unit into forward or neutral drive is sufficient to provide latching engagement of the marine drive unit **10** as shown in FIG. 1 since the reverse latch assembly has been moved to a non interfering position with the locking pin means **32**.

Manual release of the reverse latch **82**, as set out previously, is provided by the bent tang portion **90**. Manipulation of this portion of the latch **82** in a counterclockwise direction releases its engagement with the pin locking means **32** so that no obstruction is offered by this latch to upward swinging of the outboard power leg **14**. In order to manually release the forward latch, a latch release handle **108** is provided, this latch release handle is generally in the form of a right angle bent lever in end view and extends transversely to the major portion of the forward latch in assembled position. The latch release handle **108** is attached to the outer kick up lever **40** by means of an ear **110** integral with the outer kick up lever that extends firstly transversely to the major linear direction of the forward latch and secondly at a right angle thereto so as to provide a substantially parallel portion **111** to the angular portions **44, 44** of the outer kick up lever **40**. A pair of bores **112, 112** in the parallel extending portion **111** of the ear **110** provides for insertion of a pair of machined, threaded screws **113, 113** which are threadedly received in a pair of threaded bores **114, 114** of a portion **115** of the latch release handle **108**. By this structural arrangement, sufficient leverage is provided by the latch release handle **108** so that the forward latch assembly **28** may be easily released by an upward force exerted thereon by an operator desiring to manually move the outboard power leg **14** to kick up position.

It should be clear from the foregoing description that the objects of the invention have been fully obtained by the mechanism described and that a marine drive latch means being compact in design and having positive locking characteristics and also positive kick up is provided.

While only a single embodiment of this invention has been shown and described, it is understood that many changes can be made therein without departing from the scope of the invention.

What is claimed is:

1. In a marine drive unit having an outboard power leg member, the combination comprising: (a) a relatively immovable member, (b) a pivot means for pivotally mounting said outboard power leg member for vertical pivotal movement about said relatively immovable member, (c) latch engaging means mounted on one of said members, (d) latch means pivotally mounted on the other of said members, (e) a portion of said latch means providing a reversing latching function and resiliently urged upwardly into engagement with said latch engaging means, said portion of said latch means including an upwardly opening notch means for engaging said latch engaging means, (f) a portion of said latch means including a downwardly depending latching element resiliently urged sidewardly into engagement with said latch engaging means and having a cutaway notched portion opening generally sidewardly for engaging said latch engaging means, said downwardly depending latching element being in confronting, opposed relationship to said portion of said latch means providing a reversing latching function, and (g) an angularly extending lever extending between said latching element and said latch means pivotal mounting whereby said outboard power leg is latchingly attached to said relatively immovable member.

2. In a marine drive unit having an outboard power leg member mounted with a yoke member for steering movement, the combination comprising: (a) a relatively immovable fixed housing, (b) a pivot means for pivotally mounting said yoke for vertical pivoting, (c) latch engaging means mounted on said relatively immovable fixed housing, (d) latch means pivotally mounted on said yoke member, (e) said latch means including a reverse latch, (f) spring means constantly biasing said reverse latch upwardly into engagement with said latch engaging means, (g) said reverse latch including a bent tang portion for urging said reverse latch away from engagement with said latch engaging means, (h) said latch means including a forward latch, said forward latch including an angularly extending portion extending upwardly from said pivot means, (i) an abutment means on said angularly extending portion, and (j) a downwardly extending latching element engaging said abutment means and said latch engaging means, said downwardly extending latching element being urged to said position by coil spring means acting between said latching element and said fixed housing.

3. In a marine drive unit having an outboard power leg member mounted with a yoke member for steering movement, the combination comprising: (a) a relatively immovable fixed housing, (b) a pivot means for pivotally mounting said yoke for vertical pivoting, (c) latch engaging means mounted on said relatively immovable fixed housing, (d) latch means pivotally mounted on said yoke member, (e) said latch means including a reverse latch and a forward latch, (f) said reverse latch receiving nestingly a portion of said forward latch, (g) said forward and reverse latch engaging said latch engaging means and being pivoted as a common pivot on said yoke member, and (h) said forward latch including an angular portion extending for common pivot as a downwardly depending latch element pivotally attached to said angular portion.

4. In a marine drive unit having an outboard power leg member mounted with a yoke member for steering movement, the combination comprising: (a) a relatively immovable fixed housing, (b) a pivot means for pivotally

mounting said yoke means for vertical pivoting, (c) pin means serving as a latch engaging element mounted on said relatively immovable fixed housing, (d) a reverse latch means of general U-shape including a bight portion and a pair of leg portions extending toward said pin means, (e) an upstanding portion integral with said bight portion and terminating in a bent tang portion providing an abutting operating surface, (f) pivot means for mounting said reverse latch means on said yoke means, (g) leaf spring means disposed between said yoke means and said upstanding portion of said reverse latch means for urging said reverse latch into engagement with said pin means, (h) forward latch means pivotally mounted on said pivot means mounting said reverse latch means, (i) said forward latch means including an element generally U-shaped in cross section, the leg portion of said element extending angularly from said pivot means in nesting relationship between said legs of said reverse latch, (j) said legs being connected together by a bight portion of said U-shape, (k) said bight portion including an inclined portion and a vertical portion, (l) said vertical portion providing a first abutting surface and said inclined portion providing a second abutting surface, (m) a latch striker element pivotally disposed between the legs of said forward latch and abutting said first abutting surface when said striker element is generally vertically disposed and engaging said second abutting surface when said latch element is pivoted to an upset position, and (n) coil spring means disposed between said latch striker element and said relatively immovable fixed housing.

5. In a marine drive unit having an outboard power leg member as set forth in claim 4 wherein said coil spring means are engaged and guided by a hat shaped element fixed relative thereto.

6. In a marine drive unit having an outboard power leg member as set forth in claim 4 wherein said reverse latch means includes abutting means for preventing reengagement of said reverse latch upon downward swinging of said outboard power leg.

7. In a marine drive unit having an outboard power leg member, the combination comprising: (a) a relatively immovable member, (b) a pivot means for pivotally mounting said outboard power leg member for vertical pivotal movement about said relative immovable member, (c) latch engaging means mounted on one of said members, (d) latch means pivotally mounted on the other of said members, (e) said latch means including a downwardly depending latch element engageable with said latch engaging element and an angularly extending link pivotally attached to said downwardly depending latch element, (f) said angularly extending link being clevis shaped and having two parallel, laterally spaced arms forming the generally linear extent of the said angularly extending link, (g) said latch element being disposed between said two parallel spaced arms and being in abutting relationship with at least a portion of said angularly extending link, and (h) resilient means acting directly between said angularly extending link and said latch element whereby said latch element is resiliently loaded against disengagement from said latch engaging element.

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TRYGVE M. BLIX, Primary Examiner